

110205 Stack 'em Up

The Big City has many casinos. In one of them, the dealer cheats. She has perfected several shuffles; each shuffle rearranges the cards in exactly the same way whenever it is used. A simple example is the “bottom card” shuffle, which removes the bottom card and places it at the top. By using various combinations of these known shuffles, the crooked dealer can arrange to stack the cards in just about any particular order.

You have been retained by the security manager to track this dealer. You are given a list of all the shuffles performed by the dealer, along with visual cues that allow you to determine which shuffle she uses at any particular time. Your job is to predict the order of the cards after a sequence of shuffles.

A standard playing card deck contains 52 cards, with 13 values in each of four suits. The values are named *2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King, Ace*. The suits are named *Clubs, Diamonds, Hearts, Spades*. A particular card in the deck can be uniquely identified by its value and suit, typically denoted *< value > of < suit >*. For example, “9 of Hearts.” or “King of Spades.” Traditionally a new deck is ordered first alphabetically by suit, then by value in the order given above.

Input

The input begins with a single positive integer on a line by itself indicating the number of test cases, followed by a blank line. There is also a blank line between two consecutive inputs.

Each case consists of an integer $n \leq 100$, the number of shuffles that the dealer knows. Then follow n sets of 52 integers, each comprising all the integers from 1 to 52 in some order. Within each set of 52 integers, i in position j means that the shuffle moves the i th card in the deck to position j .

Several lines follow, each containing an integer k between 1 and n . These indicate that you have observed the dealer applying the k th shuffle given in the input.

Output

For each test case, assume the dealer starts with a new deck ordered as described above. After all the shuffles had been performed, give the names of the cards in the deck, in the new order. The output of two consecutive cases will be separated by a blank line.

Sample Input

```
1
2
2 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 52 51
52 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 1
1
2
```

Sample Output

```
King of Spades
2 of Clubs
4 of Clubs
5 of Clubs
6 of Clubs
7 of Clubs
8 of Clubs
9 of Clubs
10 of Clubs
Jack of Clubs
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Queen of Clubs
King of Clubs
Ace of Clubs
2 of Diamonds
3 of Diamonds
4 of Diamonds
5 of Diamonds
6 of Diamonds
7 of Diamonds
8 of Diamonds
9 of Diamonds
10 of Diamonds
Jack of Diamonds
Queen of Diamonds
King of Diamonds
Ace of Diamonds
2 of Hearts
3 of Hearts
4 of Hearts
5 of Hearts
6 of Hearts
7 of Hearts
8 of Hearts
9 of Hearts
10 of Hearts
Jack of Hearts
Queen of Hearts
King of Hearts
Ace of Hearts
2 of Spades
3 of Spades
4 of Spades
5 of Spades
6 of Spades
7 of Spades
8 of Spades
9 of Spades
10 of Spades
Jack of Spades
Queen of Spades
Ace of Spades
3 of Clubs

